

ASSESSMENT OF CAROLINA BAYS IN GEORGIA

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REFERENCE: Proceedings of the 2001 *Georgia Water Resources Conference*, held March 26-27, 2001, at the University of Georgia. Kathryn J. Hatcher, editor, Institute Ecology, The University of Georgia, Athens, Georgia.

Abstract. An assessment of the ecological integrity of Carolina bays in Georgia is the subject of an ongoing investigation by the Georgia Natural Heritage Program. Presented are the general methodologies and preliminary results of the study. The project is divided into two major phases, one focusing on remote assessment and the other on field surveys. Concurrent efforts include providing technical support to landowners and developing educational materials for broadcast media, schools, and local groups.

INTRODUCTION

Carolina bays are shallow, elliptical wetlands that are scattered along much of the Atlantic Coastal Plain in the Southeastern United States. In addition to supporting a variety of wetland communities and functions, Carolina bays provide habitat for dozens of rare species. Since protecting these rare species and natural communities is a priority of the Georgia Natural Heritage Program, collaborative efforts were forged with the U.S. Fish and Wildlife Service to conduct an intensive assessment of Carolina bays in Georgia. The project began late in 2000 and will continue through 2001.

Much of the research conducted on Carolina bays has been focused on those found in North and South Carolina. The Carolina bays of Georgia have not received the same degree of attention. Although authors like Prouty (1952) and Wharton (1978) addressed the distribution of Carolina bays in Georgia, their research did not provide detailed ecological data nor were the authors able to achieve the degree of accuracy in map making that is now possible with GIS technology. This project is designed to begin to close this knowledge gap and to provide a foundation for applying conservation and restoration efforts.

The first phase of the project is a remote assessment. In this assessment, Carolina bays are digitized into GIS shapefiles and attributed with data relating to their ecological integrity. The first phase also includes an outreach component. Educational materials are

developed and presentations are being delivered to schools, local groups, and the public-at-large in order to advance the cause for conserving these habitats. The second phase of the project will primarily be field-oriented and will include conducting botanical and zoological surveys, introducing landowners to a suite of incentive programs, and ground-truthing remotely-acquired assessment data. As with the first phase, educational outreach efforts will continue. Information generated from this project will be used to prioritize preservation and restoration efforts.

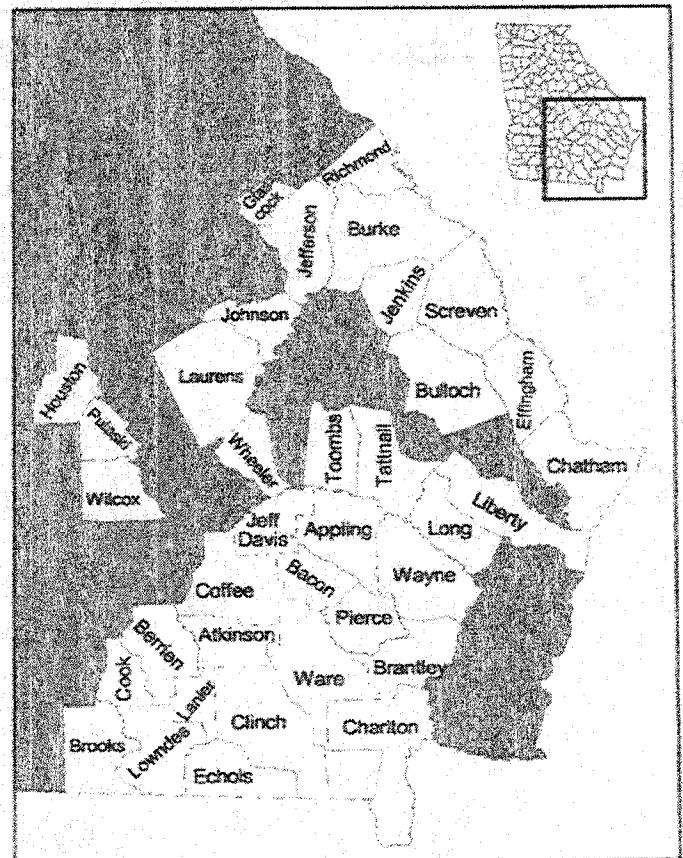


Figure 1. Study area counties for the Carolina Bay Assessment.

METHODOLOGY

Digitizing Carolina Bays

The study area encompasses 36 counties (Figure 1) and is based on a review of 1997-1998 LandSat imagery (Bands 4, 5, and 6 at 30 m resolution) and on the results of previous studies (Prouty 1952, Wharton 1978). Carolina bays and bay-like formations greater than about 10 acres (> 4 ha) were screen-digitized from geographically referenced, black and white aerial photography (NAPP imagery from 1993) using ArcView 3.1 GIS software (Figure 2). Bays were digitized at a scale of 1:12,000 in order to ensure that polygons would be accurate at 1:24,000. The output scale of 1:24,000 was targeted to correspond with commonly used 7.5' USGS topographic maps. To facilitate digitization, staff generated several custom scripts using the Avenue programming language of ArcView. Many of these scripts are modular in their construction, permitting their application to a variety of other projects, and will be made available to the public.

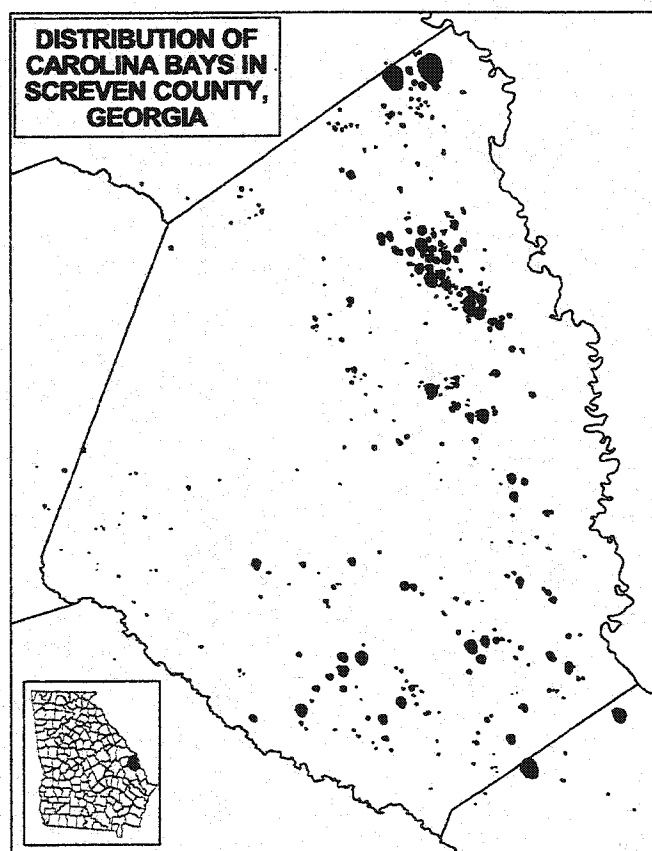


Figure 2. Digitized Carolina bays of Screven County, GA.

Remote Assessment of Carolina Bays

Much of the remote assessment is conducted using true-color, oblique aerial photography obtained through the USDA Farm Services Agency (FSA). FSA offices can be found in many (if not most) Georgia counties and their staff have demonstrated a willingness to allow researchers to review their slides for assessment purposes. For areas that do not have recent imagery, a combination of resources are employed to gauge ecological integrity including limited surveys by aircraft, limited acquisition of 1999 infra-red photography, and more intensive field surveys during the second phase of the project.

During the remote assessment, several parameters are gauged for each bay, including topography, hydrologic isolation, vegetative composition, and degree of disturbance. Parameters are assigned numerical values representing a suite of qualitative criteria. For example, a bay with no obvious disturbance might be given a rating of "1," whereas a bay that had been intensively impacted would be rated a higher number according to the type and degree of disturbance.

Field Surveys

The second phase of the project will focus on field surveys and landowner relations. Field surveys are designed to accomplish three major objectives: 1) ground-truthing remote assessments, 2) investigating the ecology and gauging the integrity of bays at a finer scale, and 3) conducting surveys to target rare species.

Landowner Support

During field surveys, landowners will be asked to join DNR biologists during field excursions in order to learn about the ecology and values of these systems and will be asked to consider participating in a variety of incentive programs designed to conserve or restore Carolina bay habitats and the species they support. Some of these incentives to be promoted include conservation easements, Farm Bill programs, tax incentives, cost-share programs, and technical assistance.

Outreach Efforts

Printed materials and imagery are currently being created for an outreach effort scheduled to begin in early summer of 2001. The means of outreach will include submissions to many of the local newspapers, presentations to schools and local groups, and several person-to-person meetings. Also being considered is the development of an educational poster and media

packages for radio and television. Active outreach efforts are important elements of both phases of the project.

DISCUSSION

Digitizing the Carolina bays found in Georgia has proven more subjective than anticipated in part because some deviate from the traits typical of those found in North and South Carolina. In Georgia, bays have a tendency to be oriented closer to a north-south axis. Many of them are not hydrologically isolated, are not clearly elliptical in outline, do not have pronounced sand rims, and often are not parallel with other bays in the vicinity. Moreover, karst topography (i.e. limestone subsidence depressions) also occur in the area, complicating accurate delineation. Despite these complicating factors reasonable criteria have been developed for accurately segregating and delineating Carolina bays in Georgia.

ACKNOWLEDGEMENTS

The Georgia Natural Heritage Program would like to thank the USDA Farm Services Agency for providing access to aerial photography. Special appreciation is extended to those contributing their time and expertise to this project and toward the advancement of Carolina bay protection in Georgia.

LITERATURE CITED

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